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## SECTION 2

# Alternatives Considered

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This section describes the range of alternatives developed to address the purpose and need factors identified in Section 1, Purpose of and Need for the Proposed Action. Section 2 presents a broad range of alternatives considered; evaluates the range of alternatives; identifies reasonable alternatives retained for detailed study; and explains why other alternatives were eliminated from further consideration.

## 2.1 Development of Initial Range of Alternatives

The Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) recognizes that many alternatives may exist for implementing a particular action. The Council on Environmental Quality regulations state that only reasonable alternatives should be carried forward for detailed evaluation and comparison. Reasonable alternatives are practical and feasible for addressing the project's purpose and need; can avoid, minimize, or mitigate overall social, environmental, and economic impacts, to the extent practicable; and are consistent with both regional and local planning goals and objectives.

The remainder of this section explains the process of selecting reasonable alternatives for future transportation improvements to the study-area freeway system.

### 2.1.1 No-Build

The No-Build Alternative does not include any safety or capacity improvements. Only maintenance and minor improvements would be performed. This alternative serves as a baseline for comparison to the Build Alternatives.

### 2.1.2 Transportation Demand Management Alternative

The Transportation Demand Management (TDM) Alternative strives to reduce the number of automobile trips through increased transit ridership and other strategies. The public transit system element of *A Regional Transportation System Plan for Southeastern Wisconsin: 2035* recommends several ways to increase bus service in Milwaukee County (SEWRPC, 2006b). Options (to be studied by others based on state statutes<sup>1</sup>) include the following:

- Rapid-transit bus system operating on freeways to provide commute and reverse commute service
- Express bus system operating at higher speed with limited-stop arterials
- Local bus system operating on arterial and collector streets with frequent stops

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<sup>1</sup> The state legislature has placed responsibility for "coordinating of transit and commuter rail programs in the region" on the regional transit authority rather than WisDOT. WisDOT's role in rail transit is capped at funding 50 percent of the non-federal share, or 25 percent of the total, whichever is less (Wis. Stat. 59.58(6) and 85.064).

Milwaukee County Transit System (MCTS), Washington County Commuter Express, Coach USA, Greyhound Bus Lines, and Badger Bus currently provide transit service in the study area. WisDOT has also implemented a RIDESHARE program that offers phone and internet services to match potential carpoolers based on route and personal preferences. Other TDM measures include telecommuting and flexible work schedules.

### 2.1.3 Transportation System Management Alternative

The Transportation System Management (TSM) Alternative includes measures to maximize the efficiency and use of the highway system to help alleviate or postpone the need to expand capacity. The TSM element of the SEWRPC regional transportation plan recommends measures such as freeway traffic management (ramp meters, bus, and HOV lanes on ramps) and intelligent transportation systems (advanced traveler information for transit and highway travel conditions).

TSM measures in the study area include the following:

- Ramp metering
- HOV lanes on entrance ramps
- Freeway monitoring with variable message signs warning travelers of delays
- Closed-circuit television cameras that post images and traffic conditions to local newscasts and the internet
- Crash investigation sites
- Enhanced freeway patrols to help remove disabled vehicles quickly from the freeway
- “511” caller information system for highway travel conditions and transit information

### 2.1.4 Build Alternatives

The preliminary range of Build Alternatives was developed in the context of regional transportation plans and various forms of community involvement (including public workshops and public information meetings; meetings with local officials, citizens, and interest groups; input from the Community Advisory Committee and Technical Advisory Committee; coordination with state and federal review agencies; and input from Native American interests) and with thorough consideration of adjacent development, socioeconomic factors, and environmental constraints.

The Build Alternatives initially considered were:

- Replace-in-Kind: The Replace-in-Kind Alternative would replace the study-area freeway system in its current configuration (three lanes in each direction, left-hand entrance and exit ramps, closely spaced interchanges, and no change in the horizontal or vertical alignment of the freeway or interchanges).
- Spot improvements: Replacing the existing roadway and bridges in or close to their existing configuration while addressing safety issues that can be fixed with little or no new right-of-way acquisition. The Spot Improvement Alternatives include building auxiliary lanes and service roads on each of the four approach legs without changing the

Zoo Interchange configuration. Selected service interchanges would be reconfigured to improve traffic operations.

- Modernization improvements (6-lane): Replacing the existing roadway and bridges and reconfiguring the study-area freeway system to address the safety issues described in Section 1, Purpose of and Need for the Proposed Action.
- Modernization improvements with added capacity (8-lane): Utilizing the modernization improvements alternative while also adding one new lane in each direction to address congestion as described in Section 1, Purpose of and Need for the Proposed Action.

The Build Alternatives also include reconstruction of the existing service interchanges in the study area (Highway 100 interchange with I-94, 84th Street interchange with I-94, Greenfield Avenue interchange with I-894/US 45, Bluemound Road interchange with US 45, Wisconsin Avenue interchange with US 45, Watertown Plank Road interchange with US 45, and North Avenue interchange with US 45).

As part of the Build Alternatives, WisDOT and FHWA evaluated a new service interchange with US 45 at Swan Boulevard. WisDOT and FHWA also evaluated adding a direct northbound exit from northbound US 45 to eastbound North Avenue as part of the reconstruction of the North Avenue interchange.

## 2.2 Initial Alternatives Screening

The alternatives described above were assessed based on their ability to meet the project's purpose (see Section 1.2, Purpose of the Proposed Action). Each was assessed using the following factors:

- Maintain a key link in the transportation network, consistent with the regional transportation plan.
- Address the obsolete design of the study-area freeway system to decrease crashes, which includes replacing left-hand entrances and exits, providing adequate weaving distances between exit and entrance ramps, providing desirable design speed, and providing adequate inside shoulder width. This is measured by the extent to which the alternative meets current design standards (see Section 1.3.3 and 1.3.4).
- Replace deteriorating pavement and bridges (see Section 1.3.4).
- Improve traffic operations and accommodate future volumes on the study-area freeway system and service interchanges. This is measured by level of service, a rating of congestion from A to F, as described in Section 1.3.5.

In addition to their ability to meet the project's purpose, the alternatives were assessed on their ability to minimize impacts to the natural and built environment and construction cost as well as the support the various alternatives received from local governments and the public. WisDOT and FHWA obtained input at public information meetings and through nearly 300 small group meetings with neighborhood, environmental, community, minority, and business groups, elected officials, and local government staff.

### 2.2.1 No-Build Alternative

While the No-Build Alternative would include pavement maintenance and minor safety improvements over time, such improvements would not address the purpose of, and need for, the project with respect to safety concerns, existing highway deficiencies, and future traffic demand. Furthermore, it would not be consistent with regional transportation system plans that document the importance of the study-area freeway system for the movement of people, goods, and services and a regional transportation system designed to meet the travel needs of southeastern Wisconsin.

The No-Build Alternative is not considered a reasonable course of action but is used as a basis for comparison to the Build Alternatives.

While it would have minimal environmental impacts and have no construction cost, the No-Build Alternative would not address the following project purpose and need factors:

- Maintain a key link in the transportation network, consistent with the regional transportation plan: This alternative would eventually result in weight restrictions on bridges and more frequent and extensive maintenance. It is not consistent with the regional plan.
- Address the obsolete design of the study-area freeway system to decrease crashes: This alternative would not address substandard design elements that contribute to crashes.
- Replace deteriorating pavement and bridges: Existing pavement and bridges would continue to deteriorate, requiring more frequent and extensive maintenance.
- Improve traffic operations and accommodate future volumes on the study-area freeway system and service interchanges: This alternative would not improve traffic operations or accommodate future traffic volumes.

Additionally, no local governments or members of the public have advocated for this alternative.

### 2.2.2 Transportation Demand Management Alternative

SEWRPC's regional transportation plan assumes a 100 percent increase in public transit (in terms of revenue vehicle-miles of service), including rapid and express transit systems and substantial expansion of local bus systems where development density is sufficient to generate ridership. One of these recommended transit systems is a potential commuter rail system between Oconomowoc and downtown Milwaukee's Intermodal Station operating on existing Canadian Pacific Railway tracks. Another recommended transit system consists of a potential light rail/bus guideway from Waukesha to downtown Milwaukee on an exclusive guideway route. The plan also recommends on-street express bus services as well as freeway and non-freeway bus routes. None of the transit routes included in the regional plan would utilize freeway medians.

Even with the proposed increase in public transit, traffic volumes on the study-area freeway system are expected to increase 18 percent by 2035. As noted in Section 1, the study-area freeway system is already carrying more traffic than it was designed to carry.

While it would minimize environmental impacts and cost less than the Build Alternatives, the TDM Alternative alone would not fully address the other elements of the project's purpose and need:

- Maintain a key link in the transportation network, consistent with the regional transportation plan: Implementing TDM alone is not consistent with the regional plan.
- Address the obsolete design of the study-area freeway system to decrease crashes: This alternative would not address substandard design elements that contribute to crashes.
- Replace deteriorating pavement and bridges: Existing pavement and bridges would continue to deteriorate, requiring more frequent and extensive maintenance.
- Improve traffic operations and accommodate future volumes on the study-area freeway system and service interchanges: This alternative would not sufficiently improve traffic operations or accommodate future traffic volumes.<sup>2</sup> SEWRPC's regional transportation plan recommends adding capacity along with implementing several measures to reduce demand, most notably an increase in transit service.

Additionally, no local governments or members of the public have advocated for this as a stand-alone alternative.

For these reasons, the TDM Alternative is not considered a reasonable course of action and has been eliminated from consideration as a stand-alone alternative.

### 2.2.3 Transportation System Management Alternative

The regional transportation plan includes several TSM recommendations to maximize the efficiency and use of the highway system and help alleviate or postpone the need for expanding highway capacity in the region. WisDOT has implemented several TSM measures in the study area, including ramp metering, HOV lanes on entrance ramps, variable message signs warning travelers of delays, closed-circuit television cameras posting images and traffic conditions to local newscasts and the internet, crash investigation sites, and enhanced freeway patrols.

A 2005 study estimated that ramp metering reduced freeway delay by 5 percent in 24 urban areas. Freeway patrols that clear incidents, combined with closed-circuit television cameras that detect incidents, reduced freeway delay by 7 percent in the 60 urban areas that had one or both systems (Texas Transportation Institute, 2005). A 2002 study of variable message signs found that although travel time was not noticeably reduced, the signs are an effective routing tool (University of Minnesota, 2002). Even with these TSM measures already in place, the regional transportation plan documents the need for additional capacity on the study-area freeway system. The percentage of freeway miles in southeast Wisconsin experiencing extreme congestion during the morning and evening peak hours has increased from none in 1972 to 8.9 percent in 2001. The preferred alternative may include TSM elements, but TSM alone will not meet the purpose and need for the project, especially safety concerns. On a regional level, SEWRPC predicts that TSM and TDM measures together would have only a modest impact on congestion compared to no action.

<sup>2</sup> SEWRPC's 2035 regional transportation plan estimates that a "TSM only" plan would decrease regional vehicle miles of travel about 1 percent compared to the regional plan's No-Build Plan (Table 107, page 300).

The TSM Alternative would minimize environmental impacts and cost less to construct. While several TSM measures, such as HOV lanes on ramps, variable message signs, and closed-circuit television cameras, will likely be implemented in conjunction with a Build Alternative, the TSM Alternative alone would not, by itself, fully address any of the project's purpose and need elements:

- Maintain a key link in the transportation network, consistent with the regional transportation plan: Implementing TSM alone is not consistent with the regional plan.
- Address the obsolete design of the study-area freeway system to decrease crashes: This alternative would not address substandard design elements (left-hand entrances and exits, short weaving distances) that contribute to crashes.
- Replace deteriorating pavement and bridges: Existing pavement and bridges would continue to deteriorate, requiring more frequent and extensive maintenance.
- Improve traffic operations and accommodate future volumes on the study-area freeway system and service interchanges: Though many elements of this alternative are already in place, this alternative would not sufficiently improve traffic operations or accommodate future traffic volumes (see Section 1.3.5).

Additionally, no local governments or members of the public have advocated for this as a stand-alone alternative.

For these reasons, the TSM Alternative is not considered a reasonable course of action and has been eliminated from consideration as a stand-alone alternative. The Corps of Engineers asked whether it is reasonable to couple TSM and TDM measures with one of the Modernization Alternatives (Appendix D, pages D-4 through D-7). The Modernization Alternatives assume certain TDM elements will be implemented, and would include certain TSM elements like ramp metering, variable message signs, crash investigation sites, and closed-circuit television cameras. In this sense the Modernization Alternatives are a type of hybrid alternative.

## **2.2.4 Build Alternatives**

### **Replace-in-Kind Alternative**

While the Replace-in-Kind Alternative would include pavement and bridge replacement, such improvements would not address the purpose of, and need for, the project with respect to safety concerns, existing geometric deficiencies, and future traffic demand. Furthermore, it would be inconsistent with regional transportation system plans that document the importance of the study-area freeway system for the movement of people, goods, and services and a regional transportation system designed to meet the travel needs of southeastern Wisconsin.

While it would address deteriorated pavement and bridges, have minimal environmental impacts, and lower construction cost than the Build Alternatives, the Replace-in-Kind Alternative would not address the following project purpose and need factors:

- Maintain a key link in the transportation network, consistent with the regional transportation plan: This alternative is not consistent with the regional plan.



- Address the obsolete design of the study-area freeway system to decrease crashes: This alternative would not address substandard design elements that contribute to crashes.
- Improve traffic operations and accommodate future volumes on the study-area freeway system and service interchanges: This alternative would not improve traffic operations or accommodate future traffic volumes.

Additionally, no local governments and few members of the public have advocated for this alternative.

For these reasons, the Replace-in-Kind Alternative is not considered a reasonable course of action and has been removed from consideration.

### Spot Improvements

The Spot Improvement Alternatives would replace the existing freeway and bridges while addressing the safety issues that can be fixed with modest right-of-way acquisition. The Spot Improvement Alternatives would include six freeway lanes, auxiliary lanes, and service roads on each of the four approach legs without changing the Zoo Interchange configuration. Selected service interchanges would be reconfigured to improve traffic operations.

WisDOT and FHWA developed three spot improvement alternatives (SI-1, SI-2, and SI-3), which share the common features previously noted.

**Spot Improvement Alternative 1 (SI-1).** The key feature of SI-1 is a system of service roads that control access to the freeway from the service interchanges at Highway 100, Greenfield Avenue, Bluemound Road, and 84th Street (**Exhibit 2-1**). Motorists entering the freeway at these four interchanges would travel on a service road for nearly 2 miles before merging into freeway traffic. In some cases, motorists would make a U-turn on the service road prior to reaching the freeway. For example, a motorist entering eastbound I-94 from Highway 100 would travel on a service road into the Zoo Interchange, then south through a U-turn, and enter I-94 east of 84th Street (**Exhibit 2-2**). The service roads would reduce weaving between the Zoo Interchange and the adjacent service interchanges (Greenfield, Highway 100, Bluemound Road, and 84th Street).

Access to and from US 45 would be modified at the Bluemound Road/Wisconsin Avenue interchange. The Wisconsin Avenue interchange would be removed and replaced by a new northbound entrance and exit to 95th Street between Wisconsin Avenue and Bluemound Road. A southbound US 45 exit to Bluemound Road would be provided but no southbound entrance to US 45 would be provided from Wisconsin Avenue or Bluemound Road. SI-1 would require relocation of one residence.

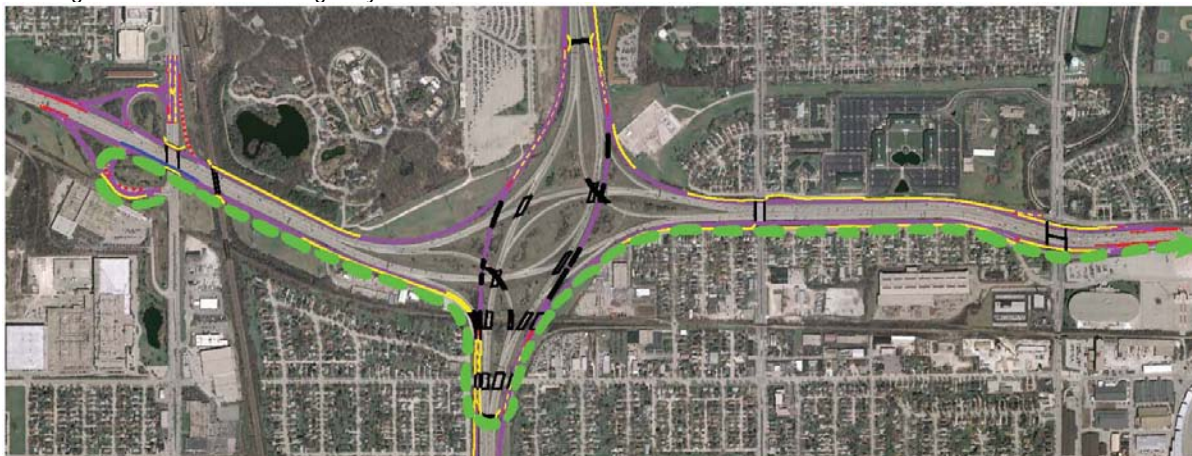
**EXHIBIT 2-1**  
Alternative SI-1

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**EXHIBIT 2-2**

Entering Eastbound I-94 from Highway 100 under SI-1



**Spot Improvement Alternative 2 (SI-2).** The key feature of SI-2 is auxiliary lanes along one or both sides of the study-area freeway system (**Exhibit 2-3**). The Bluemound Road/Wisconsin Avenue interchange would be reconfigured like SI-1. Service roads on both sides of US 45 between Wisconsin Avenue and Watertown Plank Road would provide direct access to the Regional Medical Center and the Milwaukee County Research Park. The one-way service roads are similar to one-way frontage roads alongside the freeway with Texas U-turns to allow motorists access over the freeway. SI-2 would require relocation of one residence.

**Spot Improvement Alternative 3 (SI-3).** SI-3 has many of the same features as SI-2, but would also reconfigure the 84th Street and Greenfield Avenue interchanges (**Exhibit 2-4**). At the 84th Street interchange, a service road along I-94 between 84th Street and 76th Street would replace the existing westbound entrance and eastbound exit ramps. An entrance to westbound I-94 and an exit from eastbound I-94 would be located on the service road between 84th Street and 76th Street (**Exhibit 2-5**). Motorists on 84th Street wishing to enter I-94 westbound would travel east on the service road along the south side of I-94, follow the Texas U-turn near 76th Street, and enter I-94 from the service road on the north side of I-94. This configuration gives motorists more distance to merge into the correct lane as they enter the Zoo Interchange. The entrance to westbound I-94 would be about 0.5 mile east of the existing entrance to westbound I-94.

**What is a Texas U-turn?**

Texas U-turns, or Texas Turnarounds, are ramps that allow a vehicle traveling on a one-way frontage road to turn around and travel in the opposite direction on another frontage road on the other side of a freeway. Texas U-turns are desirable because the vehicle does not have to make two left turns at a cross street, as would be typically be necessary when completing this movement. This eases congestion at the intersections. This particular highway configuration is particularly common in Texas but can also be found in other states, such as Michigan, where frontage roads travel along freeways.



**EXHIBIT 2-3**  
Alternative SI-2

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**EXHIBIT 2-4**  
Alternative SI-3

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**EXHIBIT 2-5**  
Service Road Texas U-Turn Illustration

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The Greenfield Avenue interchange with I-894/US 45 would be reconstructed the same way as the 84th Street interchange. Motorists on Greenfield Avenue wishing to enter I-894/US 45 northbound would travel south on the service road along the west side of I-894/US 45, follow the Texas U-turn near Lincoln Avenue, and enter I-894/US 45 from the service road on the east side of I-894/US 45.

Swan Boulevard would be modified to provide direct access to/from Swan Boulevard and US 45 without having to travel through the Watertown Plank Road interchange under SI-3.

SI-3 would relocate one residence and one business (Denny's Restaurant on North Avenue).

### **Evaluation of Spot Improvement Alternatives Against Purpose of and Need for the Project.**

While the spot improvement alternatives would address deteriorated pavement and bridges, have less environmental impacts, and lower construction cost than the Build Alternatives, they would meet only some elements of the project's purpose and need:

- Maintain a key link in the transportation network, consistent with the regional transportation plan: This alternative is not consistent with the regional plan.
- Address the obsolete design of the study-area freeway system to decrease crashes: These alternatives would not address all substandard design elements. A combination of left- and right-hand entrance and exit ramps would remain, resulting in unsafe weaving. Ramps with curves that are too sharp would also remain, as would narrow inside shoulders in several locations.
- Improve traffic operations and accommodate future volumes on the study-area freeway system and service interchanges: While these alternatives may improve traffic operations by providing auxiliary lanes and service roads at select locations and addressing some substandard design issues, they would not accommodate future traffic volumes. All four approach legs of the Zoo Interchange would generally operate at level of service D and E, with several areas near service interchanges operating at level of service F in the 2035 P.M. peak hour. The core of the Zoo Interchange would generally operate at level of service C and D.
- Replace deteriorating pavement: These alternatives would replace existing pavement.

All local units of government support the need to modernize the study-area freeway system and address all safety issues as discussed in Section 1, Purpose of and Need for the Proposed Action. No local governments have advocated for the spot improvement alternatives, and these alternatives have little public support. The spot improvement alternatives are not consistent with the regional transportation plan.

The spot improvement alternatives have been eliminated from consideration because they would address only some of the safety deficiencies, would not address most of the substandard design elements, and are not supported by the public or local governments.

### **Modernization Alternatives**

WisDOT and FHWA evaluated modernizing the study-area freeway system to eliminate all safety and design deficiencies. WisDOT and FHWA developed several Modernization Alternatives, including 6-lane and 8-lane versions.

**Core.** The core of the Zoo Interchange is defined as I-94 from roughly 92nd Street to Highway 100, and US 45 from Schlinger Avenue to Bluemound Road. The core design of the Zoo Interchange is similar under all the Modernization Alternatives (**Exhibit 2-6**):

- All exits on the right; through traffic stays left
- Full 8- to 12-foot shoulders on all ramps and freeways
- 2 to 3 lanes on all through routes
- 3 to 4 lanes on all four approach legs
- The interchange would have five levels rather than three, making it about 30 to 40 feet higher than it is today
- Several ramps that have one lane today would have two lanes:
  - The ramp from I-94 eastbound to I-894/US 45 southbound would be two lanes.
  - The ramp from I-894/US 45 northbound to I-94 westbound would be two lanes.
  - The ramp from US 45 southbound to I-94 eastbound would be two lanes.
  - The ramp from I-94 westbound to US 45 northbound would be two lanes.
- Smoother curves on all interchange ramps (minimum 45 mph design speed, compared to as low as 30 mph today)
- I-94 and US 45 would have a 60 mph design speed.

The footprint of the Zoo Interchange core will stay mostly the same with the exception of two areas:

- In the northwest quadrant, a loop ramp would be built to carry traffic from I-94 westbound to Greenfield Avenue. The loop ramp would lie on land owned by We Energies close to the Milwaukee County Zoo parking lot and picnic area. Also in the northwest quadrant, a ramp that would carry traffic from US 45 southbound to I-94 would impact the Milwaukee County Zoo's overflow parking lot and the Zoofari Conference Center.
- In the southwest quadrant, the Milwaukee County Zoo maintenance facility, five residences and one business would be relocated to accommodate the ramp from I-94 eastbound to I-894/US 45.

Because the core layout of the interchange would be the same under all Modernization Alternatives, any Modernization Alternative on one leg of the study-area freeway system would be compatible with any Modernization Alternative on another leg. The Modernization Alternatives are described by leg.

**West Leg.** Each of the three alternatives below could be implemented with 6 lanes or 8 lanes.



**EXHIBIT 2-6**  
Core Zoo Interchange

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**Modernization Alternative 1 (W1).** The Highway 100 interchange would be reconstructed in generally the same configuration as the existing interchange except (1) the entrance and exit ramps would be extended to provide a longer distance for motorists to accelerate/decelerate when entering/exiting I-94, and (2) the existing westbound I-94 exit to northbound Highway 100 would be removed and replaced by a loop ramp (**Exhibit 2-7**). A new entrance ramp to I-94 eastbound from Highway 100 would allow motorists to enter eastbound I-94 without having to weave across motorists who are exiting I-94 to I-894/US 45. Traffic on westbound I-94 would be able to exit to Highway 100 without weaving across motorists entering I-94 westbound from US 45 or I-894.

**Modernization Alternative 2 (W2).** The Highway 100 interchange with I-94 would be the same configuration as described under Alternative W1.

**Modernization Alternative 3 (W3).** The Highway 100 interchange with I-94 would be reconfigured. Two of the three exit ramps (one westbound, one eastbound) would remain in roughly the same configuration but lengthened to provide adequate acceleration/deceleration distance. The existing westbound I-94 exit to northbound Highway 100 would be removed. The entrance ramps from Highway 100 to I-94 would be consolidated into one ramp that would split into two ramps, one eastbound and one westbound (**Exhibit 2-8**).

**Table 2-1** summarizes the key impacts of the Modernization Alternatives for the west leg. A service road would be added between Highway 100 and the Zoo Interchange, like Alternative W1.

TABLE 2-1

Key Impacts of Modernization Alternatives—West Leg

W1		W2		W3	
6-lane	8-lane	6-lane	8-lane	6-lane	8-lane
No residential relocations	No residential relocations	No residential relocations	No residential relocations	No residential relocations	No residential relocations
1 commercial relocation (hotel at Hwy 100)	1 commercial relocation (hotel at Hwy 100)	1 commercial relocation (hotel at Hwy 100)	1 commercial relocation (hotel at Hwy 100)	1 commercial relocation (hotel at Hwy 100)	1 commercial relocation (hotel at Hwy 100)

**Eastbound I-94 to Greenfield Avenue Ramp (Sub-alternative).** As originally developed, none of the west leg Modernization Alternatives provided access from eastbound I-94 directly to Greenfield Avenue (via I-894/US 45). Based on input from stakeholders, WisDOT and FHWA developed a sub-alternative that would provide a ramp connecting I-94 eastbound to Greenfield Avenue to allow motorists to access Greenfield Avenue from I-94 eastbound. This sub-alternative is compatible with both the W1 and W3 alternatives. Six additional residences (four single-family and one duplex) and one additional business on South 100th Street would be relocated to accommodate this ramp.

**East Leg.** Each of the three alternatives below could be implemented with 6 lanes or 8 lanes.

**EXHIBIT 2-7**

**West Leg Modernization Alternative 1 (W1)**

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**EXHIBIT 2-8**

**West Leg Modernization Alternative 3 (W3)**

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**Modernization Alternative 1 (E1).** The 84th Street interchange would be reconstructed similar to Alternative SI-3 (**Exhibit 2-9**). A service road between 84th Street and 76th Street would replace the existing westbound entrance and eastbound exit ramps. An entrance to westbound I-94 and an exit from eastbound I-94 would be located on the service road between 84th Street and 76th Street. Motorists on 84th Street wishing to enter I-94 westbound would travel east on the service road along the south side of I-94, follow the Texas U-turn near 76th Street, and enter I-94 from the service road on the north side of I-94. This configuration gives westbound motorists more distance to merge into the correct lane as they enter the Zoo Interchange. The entrance to westbound I-94 would be about 0.5 mile east of the existing entrance to westbound I-94. The eastbound I-94 exit ramp would be placed east of 84th Street. Exiting traffic that wants to reach 84th Street would proceed east on the service drive, follow the Texas U-turn, and proceed westbound on the north service drive back to 84th Street. The westbound exit ramp and the eastbound entrance ramps would be reconstructed in locations similar to the existing ramps, and would be braided, or grade-separated, with the adjoining ramps described above.

**Combined Service Drive (Sub-alternative).** A sub-alternative would combine the service drive on the north side of I-94, located between South 84th Street and South 76th Street, with O'Connor Street to provide local street access and circulation, as well as freeway access. Combining these two roadways would reduce the impact to the Wisconsin State Fair parking lot on the south side of the freeway. The sub-alternative would provide access to the O'Connor Street neighborhood similar to today.

**Modernization Alternative 2 (E2).** The westbound entrance to I-94 from 84th Street would be a loop ramp, which would displace several residences and the Boy Scouts' council office building (**Exhibit 2-10**). The loop ramp would provide motorists with a greater distance to reach their desired lane before entering the Zoo Interchange compared to the existing ramp.

**Modernization Alternative 3 (E3).** Alternative E3 is the only one of the three Modernization Alternatives that would maintain the 84th Street interchange ramps in roughly their same configuration but with longer acceleration and deceleration lanes (**Exhibit 2-11**). The westbound entrance ramp to I-94 from 84th Street and the eastbound exit ramp from I-94 to 84th Street would be braided with ramps connecting I-94 to US 45. As a result, the "footprint" of I-94 west of 84th Street would be wider than the other Modernization Alternatives. This alternative would require relocation of 19 to 20 residences (six duplexes and seven to eight single family) and one business along the south side of I-94, and one single family residence, one duplex, two 8-unit apartment buildings, and an office building on the north side of I-94. **Table 2-2** summarizes the key impacts of the Modernization Alternatives for the east leg.

**EXHIBIT 2-9**  
East Leg Modernization Alternative 1 (E1)

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**EXHIBIT 2-10**

**East Leg Modernization Alternative 2 (E2)**

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**EXHIBIT 2-11**  
East Leg Modernization Alternative 3 (E3)

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TABLE 2-2  
Key Impacts of Modernization Alternatives—East Leg

E1		E2		E3		E1/E3 Hybrid	
6-lane	8-lane	6-lane	8-lane	6-lane	8-lane	6-lane	8-lane
No residential relocations	No residential relocations	5 to 10 residential relocations east of 84th Street	5 to 10 residential relocations east of 84th Street	38 residential relocations west of 84th Street on Adler and Chester (16 relocations are from two 8-unit apartments)	39 residential relocations west of 84th Street on Adler and Chester (16 relocations are from two 8-unit apartments)	19 residential relocations on Adler Street west of I-94	20 residential relocations on Adler Street west of I-94
No commercial relocations	No commercial relocations	No commercial relocations	No commercial relocations	7 commercial relocations (6 at Honey Creek Corporate Center and 1 on Adler)	7 commercial relocations (6 at Honey Creek Corporate Center and 1 on Adler)	1 commercial relocation on Adler Street west of 84th Street	1 commercial relocation on Adler Street west of 84th Street
No impact on Boy Scout building	No impact on Boy Scout building	Boy Scout building relocated	Boy Scout building relocated	No impact on Boy Scout building	No impact on Boy Scout building	No impact on Boy Scout building	No impact on Boy Scout building
Land acquired from State Fair parking lot	Land acquired from State Fair parking lot	Land acquired from State Fair parking lot	Land acquired from State Fair parking lot	Land acquired from State Fair parking lot	Land acquired from State Fair parking lot	Land acquired from State Fair parking lot	Land acquired from State Fair parking lot

**E1/E3 Hybrid Alternative.** Based on input from the October 2008 public information meeting, WisDOT and FHWA developed an alternative that incorporates elements of Alternative E1 and Alternative E3 (**Exhibit 2-12**). The eastbound lanes of I-94 would have the same configuration as Alternative E1, and the westbound lanes would have the same configuration as Alternative E3. This alternative would provide an eastbound exit directly to 84th Street, like Alternative E3. The westbound entrance to I-94 would be via a Texas U-turn at 76th Street, like Alternative E1. There would be no residential or business relocations on the north side of I-94, but there would be 19 (6-lane) to 20 (8-lane) residential and one business relocation on Adler Street south of I-94.

**South Leg.** Each of the three alternatives below could be implemented with 6 lanes or 8 lanes.

**Modernization Alternative 1 (S1).** The Greenfield Avenue interchange would be reconstructed like SI-3, but two one-way service roads would also be provided on both sides of I-894/US 45 between the Greenfield Avenue and Lincoln Avenue interchanges to supplement the ramp connections (**Exhibit 2-13**).

**Modernization Alternative 2 (S2).** The Greenfield Avenue interchange with I-894/US 45 would remain in roughly the same configuration except all Greenfield Avenue traffic entering northbound I-894/US 45 would use the loop ramp in the southeast quadrant (**Exhibit 2-14**). Ramps would be lengthened to provide better acceleration/deceleration distance and smoother curves. Two businesses on Greenfield Avenue adjacent to I-894/US 45 would be relocated.

**EXHIBIT 2-12**  
East Leg Modernization Alternative (E1/E3 Hybrid)

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**EXHIBIT 2-13**

**South Leg Modernization Alternative 1 (S1)**

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**EXHIBIT 2-14**  
South Leg Modernization Alternative 2 (S2)

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**Modernization Alternative 3 (S3).** The Greenfield Avenue interchange would be reconstructed as a diamond interchange (**Exhibit 2-15**). Alternative S3 between Greenfield Avenue and the Zoo Interchange would be wider than S1 and S2, and would take up most or all of the electrical transmission line right-of-way east of the freeway. The electrical transmission lines would have to move east to accommodate the freeway, likely requiring the acquisition of up to 40 single-family residences on 98th Street. Two businesses on Greenfield Avenue adjacent to I-894/US 45 would be relocated.

**Ramp from Eastbound I-94 to Greenfield Avenue Ramp (Sub-alternative).** See west leg discussion. **Table 2-3** notes the relocations needed to accommodate the ramp connection.

TABLE 2-3  
Key Impacts of Modernization Alternatives—South Leg

S1		S2		S3	
6-lane	8-lane	6-lane	8-lane	6-lane	8-lane
No residential relocations	No residential relocations	No residential relocations	No residential relocations	35–40 residential relocations on 98th Street	35–40 residential relocations on 98th Street
No commercial relocations	No commercial relocations	2 commercial relocations on Greenfield Ave	2 commercial relocations on Greenfield Ave	2 commercial relocations on Greenfield Ave	2 commercial relocations on Greenfield Ave

I-94 to Greenfield Avenue ramp sub-alternative requires six additional residential relocations and one additional commercial relocation on the south leg.

Freeway would be closer to many homes on the south leg because of longer ramps and merging areas.

**North Leg.** Each of the three alternatives below could be implemented with 6 lanes or 8 lanes. A common feature of the north leg Modernization Alternatives is that there would be no direct access to/from Bluemound Road and I-94. Drivers on I-94 would need to use 84th Street or Highway 100 to access Bluemound Road.

**Modernization Alternative 1 (N1).** The Bluemound Road interchange would provide direct access to and from US 45 only. New service roads along both sides of US 45 would provide access to and from northbound US 45 and Bluemound Road (**Exhibit 2-16**). No interchange would be provided at Wisconsin Avenue, but service roads would connect Bluemound Road, Wisconsin Avenue, and a new local road overpass north of Wisconsin Avenue that would provide access to the Regional Medical Center and the Milwaukee County Research Park. This new local road overpass would connect to an exit from southbound US 45 and a new northbound entrance ramp. Service roads would connect these ramps to Wisconsin Avenue and Bluemound Road.

The Watertown Plank Road interchange would be reconstructed in roughly the same configuration. On the east side of US 45, the exit/entrance ramps would intersect Watertown Plank Road several hundred feet east of the current ramp intersection. A connection to and from Swan Boulevard would be braided with the Watertown Plank Road ramps; access to and from Swan Boulevard and US 45 would avoid the intersection with Watertown Plank Road via a structure over Watertown Plank Road.

**EXHIBIT 2-15**  
South Leg Modernization Alternative 3 (S3)

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**EXHIBIT 2-16**

**North Leg Modernization Alternative 1 (N1)**

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***Modernization Alternative 2 (N2).*** This alternative would provide a diamond interchange at Bluemound Road, accessible from US 45 only (**Exhibit 2-17**). Motorists on I-94 would not be able to access the Bluemound Road interchange by way of US 45, nor would motorists entering US 45 southbound be able to access I-94. No freeway access would be provided at Wisconsin Avenue. A service road would connect Wisconsin Avenue and Watertown Plank Road along the east side of US 45 and provide access to the Regional Medical Center. The Watertown Plank Road interchange would be reconstructed in roughly the same configuration.

This alternative would provide a direct connection between US 45 and Swan Boulevard via a direct exit from northbound US 45 to Swan Boulevard. Motorists on Swan Boulevard would have the option of entering directly onto southbound US 45 without going through the Watertown Plank Road interchange.

***Modernization Alternative 3 (N3).*** A full interchange would be provided at Bluemound Road with access to/from US 45 only (**Exhibit 2-18**). One-way service roads would provide a connection between Bluemound Road, Wisconsin Avenue, and Watertown Plank Road on both sides of US 45. Texas U-turns (at Bluemound Road, Wisconsin Avenue and Watertown Plank Road) would allow motorists on these service roads to cross over US 45 without having to use Watertown Plank Road or Bluemound Road.

The Watertown Plank Road interchange would be reconstructed in roughly the same configuration.

Like N2, this alternative would provide a direct exit from northbound US 45 to Swan Boulevard. Motorists on Swan Boulevard would have the option of entering directly onto southbound US 45 without going through the Watertown Plank Road interchange.

***Swan Boulevard Interchange (Sub-alternative).*** Unique to Alternative N3, a full or half interchange would be built to connect Swan Boulevard and US 45. An interchange at this location would provide an additional access point to/from US 45, the Milwaukee County Research Park, and Milwaukee Regional Medical Center. A full interchange would encroach upon Milwaukee County's Wil-O-Way Special Recreation Center (2 acres) and DNR's Forestry Science Center (0.7 acre), both of which are east of US 45 and north of Swan Boulevard.

If a full interchange is built at Swan Boulevard, Swan Boulevard would be extended west and intersect Watertown Plank Road about 0.25 mile west of its current intersection. This would require reconfiguration – or perhaps relocation – of Milwaukee County Department of Public Works' storage and maintenance facility and greenhouses.

***North Avenue Diamond Interchange (Sub-alternative).*** The North Avenue interchange could be reconfigured as a diamond interchange, which would eliminate the two current loop ramps but would require (1) the relocation of the Denny's restaurant in the southeast quadrant of the interchange, and (2) reconfiguration of an access road to two hotels and a car dealer.

***North Avenue Single-Loop Interchange (Sub-alternative).*** The North Avenue interchange could be configured to retain a loop ramp in the northeast quadrant but the loop ramp in the southwest quadrant would be eliminated in favor of a conventional southbound exit ramp to North Avenue. This interchange configuration is compatible with all three north leg modernization alternatives.



**EXHIBIT 2-17**

**North Leg Modernization Alternative 2 (N2)**

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**EXHIBIT 2-18**

**North Leg Modernization Alternative 3 (N3)**

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**North Avenue Double-Loop Interchange (Sub-alternative).** The North Avenue interchange could be reconfigured in roughly the same configuration as it is today, with the two loop ramps. This sub-alternative would require no relocations or new access roads at North Avenue.

TABLE 2-4  
Key Impacts of Modernization Alternatives—North Leg

N1		N2		N3	
6-lane	8-lane	6-lane	8-lane	6-lane	8-lane
1 residential relocation	1 residential relocation	1 residential relocation	1 residential relocation	1 residential relocation	1 residential relocation
1–2 commercial relocations	1–2 commercial relocations	1–2 commercial relocations	1–2 commercial relocations	1–2 commercial relocations	1–2 commercial relocations
One child and adolescent treatment center building relocated (Bldg. F)		Avoids child and adolescent treatment center		One child and adolescent treatment center building relocated (Bldg. F)	
Less than 1 acre acquired from Underwood Parkway					
Acquisition of the Milwaukee County Zoo's overflow parking lot on the west side of US 45					
Relocation of the Zoofari Conference Center on Bluemound Road					
Right-of-way acquisition from St. Therese Church and Montessori School on the east side of US 45					

### Comparison of 6-Lane and 8-Lane Alternatives

In general, the 6-lane Alternatives would be narrower than the 8-lane Alternatives because they would have one less traffic lane in each direction. The relocation impacts are the same between the 6-lane and 8-lane Modernization Alternatives on the south, west, and north legs. The 8-lane E3 would relocate one more residence than the 6-lane E3.

The 6-lane Modernization Alternatives would have greater congestion and therefore a lower level of service compared to the 8-lane Alternatives. Under the 6-lane Alternatives, during the 2035 morning and evening rush hour, northbound US 45 would operate at level of service F almost continuously between Lincoln Avenue and Burleigh Avenue. I-94 between 70th Street and 84th Street would operate at level of service F both eastbound and westbound during the evening rush hour. I-94 near Highway 100 (eastbound and westbound) would operate at level of service F during both morning and evening rush hours, and for several hours outside of the rush hour. The North Avenue and Burleigh Avenue interchanges would operate at level of service F during the morning and evening rush hour. Other shorter segments of the study-area freeway system would operate at level of service F and E, with only a handful of locations operating at level of service D.

The three 8-lane Alternatives would vary slightly in terms of traffic operation. However, all segments of the study-area freeway system would generally operate at level of service D or better. Some short segments of the freeway system would operate at level of service E during the morning or afternoon rush hour. See Section 3.3.

The 6-lane Modernization Alternatives would meet most elements of the project's purpose and need:

- Maintain a key link in the transportation network, consistent with the regional transportation plan: This alternative would maintain the study-area freeway system as a key link in the transportation network, but the regional plan calls for adding an additional lane to the study-area freeway system.
- Address the obsolete design of the study-area freeway system to decrease crashes: These alternatives would address all substandard design elements.
- Improve traffic operations and accommodate future volumes on the study-area freeway system and service interchanges: These alternatives would improve traffic operations by providing auxiliary lanes and service roads at select locations. They would accommodate future traffic volumes generally at level of service E and F, which is below the level considered acceptable.
- Replace deteriorating pavement: These alternatives would replace existing pavement.

The 6-lane Modernization Alternatives would cost more than the spot improvements alternatives and less than the 8-lane Modernization Alternatives. Environmental impacts would be less than, though comparable, to the 8-lane Modernization Alternatives' impacts.

Local government support for the 6-lane Modernization Alternatives has come from the City of Milwaukee. At the May 2008 and October 2008 public information meetings, there was less public support for the 6-lane Modernization Alternative than the 8-lane Modernization Alternative (see Section 5.1, Public Involvement).

The 8-lane Modernization Alternatives would meet all the purpose and need elements:

- Maintain a key link in the transportation network, consistent with the regional transportation plan: This alternative is the only one that is completely consistent with the regional transportation plan.
- Address the obsolete design of the study-area freeway system to decrease crashes: These alternatives would address all substandard design elements and reduce congestion-related crashes (rear end crashes, for example) compared to the 6-lane Modernization Alternative.
- Improve traffic operations and accommodate future volumes on the study-area freeway system and service interchanges: These alternatives would improve traffic operations by adding an additional travel lane and providing auxiliary lanes and service roads at select locations. They would generally accommodate future traffic volumes at level of service C and D. No study-area freeway segments would operate at level of service F.
- Replace deteriorating pavement and bridges: These alternatives would replace existing pavement and bridges.

At the May 2008 and October 2008 public information meetings, public input supported the 8-lane Modernization Alternatives more than the spot improvement or 6-lane Modernization Alternatives. The City of Milwaukee opposes adding capacity to the freeway system anywhere in the City of Milwaukee and prefers modernization with no added capacity. The Cities of Wauwatosa and West Allis have not yet supported any alternative.

The 8-lane Modernization Alternatives would cost the most of the Build Alternatives and incur the most environmental impacts.

## 2.3 Other Alternatives Considered

Several other alternatives have been considered and dismissed for various reasons.

### 2.3.1 Level of Service C Alternative

FHWA and AASHTO's freeway design guidelines state that level of service C is the desirable level of service in urban areas, although level of service D "may be appropriate in heavily developed sections of metropolitan areas" (AASHTO, 2004a). WisDOT's FDM Procedure 11-5-3, Table 1 also indicates that a level of service C is a design goal for Corridor 2020 Backbone Routes located in urbanized areas with populations greater than 50,000.

Based on this guidance, WisDOT and FHWA developed an alternative that would provide level of service C on the study-area freeway system. This alternative would have a similar configuration to the Modernization Alternatives but provide a 70 mph design speed rather than 60 mph (The WisDOT FDM Procedure 11-10-1 indicates that a design speed of 70 mph is to be used for Corridor 2020 Backbone multilane divided highways). To accomplish this, curves would be more gradual and could potentially require more right-of-way acquisition. The level of service C alternative would feature four basic lanes in each direction and two-lane system ramps, resulting in a 16-lane cross section on each leg at the Zoo Interchange.

To properly transition from the widened freeway back to a 6-lane freeway, the project limits would be expanded west to Sunnyslope Road, south to Oklahoma Avenue, and east to Hawley Road. The north leg project terminus would remain at Burleigh Avenue. Additional right-of-way acquisition would be required to accommodate the 16-lane cross section near each leg at the Zoo Interchange core. This alternative would require roughly 250 to 300 residential relocations compared to between 6 and 32 for the Modernization Alternatives that remain under consideration. Based on the relocation impacts, this alternative was eliminated from consideration.

### 2.3.2 High-Occupancy Vehicle / High-Occupancy Toll Lanes

In the 1990s, WisDOT and FHWA considered adding lanes for the exclusive use of vehicles carrying two or more passengers (HOV lanes). HOV lanes were also considered as part of this study. In some cities, single-occupant vehicles that pay a toll are allowed to use HOV lanes. These lanes are referred to as high occupancy toll (HOT) lanes. HOV and HOT lanes can be separated from general purpose lanes by either pavement markings or a concrete barrier.

Barrier-separated lanes are safer and more effective at stopping the misuse of HOV and HOT lanes. For example, a high-speed vehicle in the HOV or HOT lane crashing into lower speed vehicles in the general purpose lanes could increase the severity of crashes. If a low-speed vehicle in the general purpose lanes illegally pulls into the HOV/HOT lanes to avoid a slowed or stopped vehicle, they could trigger a severe crash with a high-speed vehicle in the HOV/HOT lanes. A barrier also allows HOV and HOT lanes to continue to operate if there is a crash in the general purpose lanes, and vice versa.

A barrier between general purpose lanes and HOV or HOT lanes would widen the freeway because HOV and HOT lanes would need their own shoulder, in addition to the shoulder

on the general purpose lanes. **Exhibit 2-19** illustrates the width of a freeway under different combinations of general purpose and HOV and HOT lanes. Adding one HOV or HOT lane in each direction to three general purpose lanes would add about 30 to 60 feet to the width of the study-area freeway system.

The increased width of the study-area freeway system with HOV and HOT lanes would dramatically increase the number of residential relocations compared to the other Build Alternatives. At least 50 to 70 residential relocations (based on WisDOT's cursory impact analysis) would be required under this alternative compared to 6 to 32 residential relocations under the modernization with added capacity alternatives.

Buffer separated HOV and HOT lanes have the advantage of a narrower cross section but do not have the safety benefits of the barrier-separated HOV/HOT lanes. Most HOV/HOT lanes constructed around the country in the past decade have been buffer-separated due to the real estate impacts associated with barrier-separated facilities.

Motorists are typically allowed to enter and exit the HOV/HOT lanes every few miles. At these locations, the freeway needs more width to accommodate the added lane that carries motorists into and out of the HOV/HOT lanes. These HOV/HOT lane exit and entrance areas are typically in advance of and following major interchanges like the Zoo Interchange. Additional right-of-way and relocation impacts may occur depending on where these HOV/HOT entrance and exit areas would be located.

A challenge to implementing HOV lanes, either buffer or barrier-separated, on the study-area freeway system is that approximately one-half of vehicles that approach the Zoo Interchange travel straight through on the same route, with the remaining vehicles changing direction (exiting one freeway to enter another). Through HOV lanes are always constructed along the median or "inside lane" of the roadway. As such, drivers that want to exit the freeway to go in a different direction (such as I-94 westbound to US 45 northbound) would have to cross over two to three lanes of traffic to reach an exit ramp then weave across two to three lanes to reach the HOV lane after entering the new freeway on the right side. The solution to eliminating these additional weaving maneuvers is to construct ramps within the interchange core for exclusive HOV use. This would create an "interchange within an interchange," complicating the design within the limited space available for the Zoo Interchange. Other challenges include construction sequencing and traffic handling during interchange construction. If median HOV lanes were added to only one of the through routes, for instance I-94 only, then the amount of weaving on the freeway system could be better managed.

Studies on the effectiveness of HOV lanes reducing congestion in Seattle and San Francisco, and practical experience in Washington, DC and other locations, have reached different conclusions (Kwon and Varaiya, 2005). AASHTO guidance on HOV lanes suggests that they are appropriate when, among other factors, average speeds on the freeway are "less than 30 mph for a distance of about 5 miles or more" (AASHTO, 1992; 2004b). That condition does not occur on the study-area freeway system nor is it forecasted to occur by the design year.

**EXHIBIT 2-19**  
Typical Sections

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SEWRPC considered barrier-separated HOV or HOT lanes while developing *A Regional Freeway System Reconstruction Plan for Southeastern Wisconsin* and determined that the right-of-way and relocation impacts were too great (SEWRPC, 2003b). SEWRPC does not recommend implementing HOV and HOT lanes (SEWRPC, 2003b). WisDOT and FHWA were involved in preparation of *A Regional Freeway System Reconstruction Plan for Southeastern Wisconsin* and concur in its methodology and recommendations with respect to HOV lanes (see Section 1.3.1).

The study-area freeway system limits and the traffic characteristics make HOV lanes, which add weaving movements, a marginal improvement over the Modernization Alternatives. As a result, this alternative was eliminated from consideration.

DNR asked if HOV lanes could be added in the future (Appendix D, page D-29). The Modernization Alternatives do not provide space for transfer lanes to carry motorists into and out of HOV lanes or special ramps within the core of the Zoo Interchange to carry HOV traffic from one freeway to another. Buffer separated HOV lanes could be added to the Modernization Alternatives in the future, for through traffic only, by converting the inside general purpose lane to an HOV lane. This would likely reduce the overall traffic capacity of the freeway.

### **2.3.3 Adding Capacity without Widening**

In some cities, drivers are allowed to drive on the inside or outside shoulder during peak hours. Another way to add capacity is using narrower lane widths to provide additional lanes without widening the freeway.

The key benefit of these measures is increased capacity (up to 30 percent) at a low cost. The key disadvantage is that the shoulder is not available for disabled vehicles, emergency vehicle access, or snow storage. Some studies have found an increase in crash rates when the shoulder is used as a general purpose lane; other studies have found no change in crash rates (FHWA, 2003). WisDOT and FHWA have decided not to implement either narrower lanes or allow shoulder use. However, the Modernization Alternatives would not preclude using shoulders as travel lanes at some point in the future. Narrower lanes have also been ruled out since 12-foot lanes are the minimum standard for freeways.

## **2.4 Second Alternatives Screening / Alternatives Retained for Detailed Study**

After public information meetings (May and October 2008), Technical Advisory Committee meetings (June, October, and November 2008), and Community Advisory Committee meetings (July and October 2008), WisDOT and FHWA eliminated some alternatives from consideration based on public input, traffic operations, and impacts.

The following alternatives remain under consideration:

- No-Build Alternative
- Modernization with No Added Capacity (6-lane) Alternative
- Modernization with Added Capacity (8-lane) Alternative

WisDOT and FHWA continue to consider several sub-alternatives:



- A single-loop ramp interchange at North Avenue
- A double-loop ramp interchange at North Avenue
- A ramp from eastbound I-94 to Greenfield Avenue
- A combined service drive option on the north side of the east leg (E1 only)

WisDOT and FHWA have dropped consideration of a full interchange at Swan Boulevard, which included an extension of Swan Boulevard from US 45 west through the Milwaukee County Department of Public Works maintenance facility. This sub-alternative was dropped because the benefits of the interchange (better traffic operations) were not sufficient enough to justify the cost of the interchange, the Swan Avenue extension, and relocation of the maintenance facility. The adjacent Watertown Plank Road interchange would operate at an acceptable level of service without the Swan Boulevard interchange.

WisDOT and FHWA have also dropped the North Avenue diamond interchange from consideration because the loop ramp options provide better traffic operations and avoid business relocation and access issues.

The core of the Zoo Interchange would be reconstructed in generally the same configuration under each of the Modernization Alternatives. As a result, the four legs of the Modernization Alternatives may be mixed and matched to create the most effective design solution. **Table 2-5** summarizes the alternatives that remain under consideration.

TABLE 2-5  
Secondary Screening of Alternatives by Leg

Leg	Alternative	Retained or Eliminated (Proposed)	Reasons for Proposed Elimination/Retention of This Alternative
West	W1 (6- and 8-lane)	Eliminate	W3 more compatible with ramp from eastbound I-94 to Greenfield Avenue.
	W2 (6- and 8-lane)	Eliminate	Same as W1.
	<b>W3 (6- and 8-lane)</b>	<b>Retain</b>	<b>Provides best traffic operations on Highway 100. Recommended alternative for west leg.</b>
East	E1 (6- and 8-lane)	Retain	Acceptable traffic operations, less impacts than E3.
	E2 (6- and 8-lane)	Eliminate	Poor traffic operations near 84th Street westbound entrance ramp; several buildings would be relocated to accommodate loop ramp at 84th Street.
	E3 (6-lane)	Eliminate	6-lane E3 has greater impacts and more congestion than 8-lane E1.
	E3 (8-lane)	Eliminate	Greater impacts than E1 or E1/E3 hybrid; traffic operations comparable to E1/E3 hybrid.
	E1/E3 Hybrid (6- and 8-lane)	Retain	Acceptable traffic operations, less impacts than E3, and less indirection at 84th Street than E1.
South	S1 (6- and 8-lane)	Eliminate	Traffic operations not as good as S2, also encroached into utility right-of-way.
	<b>S2 (6- and 8-lane)</b>	<b>Retain</b>	<b>Recommended alternative for south leg.</b>
	S3 (6- and 8-lane)	Eliminate	Extensive residential relocation impacts due to encroachment into utility right-of-way next to freeway.

TABLE 2-5  
Secondary Screening of Alternatives by Leg

Leg	Alternative	Retained or Eliminated (Proposed)	Reasons for Proposed Elimination/Retention of This Alternative
North	N1 (6- and 8-lane)	Retain	Acceptable traffic operations.
	N2 (6- and 8-lane)	Eliminate	Widest footprint of the three north leg alternatives; poor traffic operations on northbound US 45 between the Zoo Interchange and Bluemound Road.
	N3 (6- and 8-lane)	Retain	Acceptable traffic operations.

## 2.5 Selection of Preferred Alternative

WisDOT and FHWA will identify a preferred alternative after reviewing input from a public hearing and public comment period.

The preferred alternative will be selected based on engineering and environmental factors and input from citizens, state and federal resource agencies, and local officials. Impacts of the Modernization Alternatives that remain under consideration are shown in Exhibit S-1, Impact Summary Table, and documented in Section 3. FHWA's selection of a preferred alternative will be performed in accordance with the Clean Water Act's Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230), administered by U.S. EPA and the Corps. The guidelines mandate that dredged or fill material should not be discharged into aquatic ecosystems (including wetlands), unless no other practicable alternatives are demonstrated; that such discharge will not have unacceptable adverse impacts; and that all practicable measures to minimize adverse effects are undertaken.